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REPORT

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INFORMATION FROM FOREIGN DOCUMENTS OR RADIO BROADCASTS

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OCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENS 1. UNITED STATES WITHIN THE MEANING OF ESPIONAGE ACT S 1. 31 AND 32, AS AMENDED. ITS TRANSMISSION ON THE REVELATION CONTENTS IN ANY MANNET TO AN UNAUTHORIZED PERSON IS PAC 3 DY LAW. REPRODUCTION OF THIS FORM IS PROHIBITED.

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SOURCE

Newspapers and periodicals as indicated.

SUPERSONIC MICROSCOPE DETECTS FLAWS IN METAL, OBJECTS IN DEEP WATER

/Numbers in parentheses refer to appended sources.

An entirely new field of physics has been opened up by the new supersonic microscope, , which can observe objects existing in opaque bodies.(1) Its inventor, Prof S. Ya. Sokolov of the Leningrad Electrical Engineering Institute imeni Ul'yanov (Lenin) (2), and the group of scientists who worked under him in developing the device have been awarded Stalin Prizes.(1)

The microscope sends out supersonic emissions similar to those used by the bat to determine the proximity of objects in the way of its flight. While supersonic waves travel at 330 meters per second in the atmosphere, just as do ordinary sound waves, they travel 20 times as fast in steel. However, as the supersonic waves encounter defects such as cracks, bubbles, or grains of slag, their speed changes. (3) Working on this principle, the microscope is able to penetrate metal to a depth of over 8-10 meters, determining the location of flaws with astonishing accuracy.(4) It registers the development within the metal of various physical and chemical processes, including crystal growth and the movement of microorganisms. (5) The microscope can even be used to observe objects in the depths of rivers and seas. (6)

Because of its complexity, the instrument did not immediately find broad application. Its effectiveness was greatly improved by Engineer A. S. Matveyev, who equipped it with a simple attachment of his own design, called a defectoscope, which is contained in a small carrying case. (3) The entire aggregate is, in fact, sometimes called a defectoscope. (3, 4, 5)

The defectoscope proper is fitted with to flexible tubes, one called the "mouth," the other the "ear." The mouth sends out supersonic emissions, which pass through the metal under observation and are picked up by the ear, after which they are converted into electric current and appear on a screen as a bright yellow line. If the metal subjected to examination is sound, the

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line runs evenly, while zigzags indicate the location of flaws. A photograph in Ogonek shows the microscope to consist of two units. One, about 12 inches high, with two tubes leading from it, is apparently the defectorscope proper. The other, larger unit, standing about 16 inches high, houses the screen in its upper portion. A pair of hands in the photograph are apparently holding the ends of the "mouth" and "ear" tubes to the top of a metal part.

Engineers N. N. Baryshnikov and V. S. Kultygin have been active in pushing the industrial application of the new microscope. Several plants now employ it to check every billet going to be machined.(3) The Leningrad Russkiy Dizel' Plant is making extensive use of the instrument.(2) The new microscope should play an important role in checking parts for such important items as turbines and generators now going to the sites of the great construction projects.(3)

SOURCES

- 1. Moscow, Pravia, 19 Mar 51
- 2. Stalinabad, Kommunist Tadzhikistana, 25 Mar 51
- 3. Moscow, Ogonek, 17 Dec 50
- 4. Alma-Ata, Kazakhstanskaya Pravda, 22 Mar 51
- 5. Moscow, Komsomol'skaya Pravda, 27 Mar 51
- 6. Moscow, Molodoy Bol'shevik, May 51

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